

SOME NEW SPECIES FROM THE PLIOCENE
OF
SOUTHERN CALIFORNIA
WITH A FEW CHANGES IN NOMENCLATURE

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Cantharus breaensis n. sp.

Plate I. Fig. 2

Shell thick, ventricose; spire moderately high with five rapidly enlarging whorls; whorls rounded and shouldered above; suture distinct, forming a wavy collar on the whorl above; sculptured with numerous fine, square-topped, spiral, ribs; interspaces wide, carrying intercalaries, few above the shoulder but many below; axial sculpture consists only of numerous fine incremental lines; aperture ovate; pillar straight, carrying a single low, rounded, fold near the juncture of the outer lip and columella; outer lip rather thin, inside concealed, but another specimen shows it to be crenated within; canal open, recurved; external siphonal fasciole partially broken, but was apparently heavy. Height of type 47 mm., diameter of type 31 mm., apical angle about 67°.

Localities:—Mouth of Brea Canyon, Puente Hills, Los Angeles Co., Calif. Fernando Formation, lower Pliocene. Collected by C. M. Carson. Also from the Fernando Formation of the Camulos Sheet, Los Angeles Co., Calif. Collected by L. C. Decius.

Common associates of this form at Brea Canyon are: *Alectrion fossatus* Gould, *Alectrion moranianus*, Martin, *Arca trilineata* Conrad, *Cardium quadri genarium* Conrad, *Fusinus barborensis* Trask, *Ostrea veatchii* Gabb, *Pecten ashleyi* Arnold, *Pecten oweni* Arnold, *Pecten etchegoini* Anderson, and *Turritella cooperi* Carpenter.

Cantharus ashleyi n. sp.

Plate I Figs. 6 and 7

Shell slender; spire high, with six rapidly enlarging whorls, body whorl rounded but not shouldered, earlier whorls vertical and distinctly shouldered; suture distinct forming a wavy collar on the earlier whorl; sculpture consisting of numerous fine, rounded, spiral, ribs and narrow interspaces carrying, in some cases, fine intercalaries; axial sculpture consists of small nodes on the earliest three whorls, 10 nodes to a whorl and a few incremental lines; aperture pyriform; pillar slightly curved and smooth carrying a single high rounded plait near junction of outer lip and columella; canal partly broken off, outer lip rather thin, inside crenated. Height of type 51 mm., diameter of type 28 mm., apical angle 60°.

Localities:—Near the San Fernando Tunnel, Los Angeles Co., Calif., Fernando Formation, lower Pliocene. Collected by G. H. Ashley. Another specimen from Gavin Canyon, Camulos Sheet, Los Angeles Co., Calif., collected by C. M. Carson, shows the canal to be open, slightly recurved and the external siphonal fasciole to be quite heavy. Height of paratype 54 mm., diameter of paratype about 31 mm., apical angle 61°.

This species is named for G. H. Ashley, who collected the type specimen.

Associates:—At the Gavin Canyon locality *Alectrion moranianus* Martin, *Dosinia ponderosa* Gray, *Macoma nasuta* Conrad, *Ostrea veatchii* Gabb, *Turritella cooperi* Carpenter and *Pecten cerrosensis*? Gabb are commonly found.

Cantharus elsmerensis n. sp.

Plate I Fig. 4

Shell thin, spire rather low with five or six rapidly enlarging whorls, whorl rounded and angulate above; suture distinct, forming a wavy collar on the whorl above; sculptured with about thirty-six narrow, square-topped, spiral, riblets of which eleven are above the angle of the whorl; interspaces narrower than the riblets; toward the base of the body whorl a few intercalaries appear; axial sculpture consists of about ten small nodes on the upper two or three whorls, becoming obsolete on the later whorls; a few fine incremental lines are present; aperture pyriform; pillar somewhat curved carrying one narrow horizontal fold near the junction of the outer lip and pillar; outer lip internally crenated, canal short, open, slightly curved; external siphonal fasciole almost lacking. Height of type 37 mm., diameter of type 23 mm., apical angle 72°.

Localities:—Holser Canyon, branch of Piru Valley, Ventura Co., Calif. Fernando Formation, lower Pliocene. Collected by C. M. Carson. Also from Elsmere Canyon near the forks, Ventura Co., Calif. Collected by R. B. Moran. This specimen minus the apex and part of the canal measures 46 mm. in length, and 33 mm. in diameter.

Associated with this species at the Holser Canyon locality are *Amiantis callosa* Carpenter; *Arca camuloensis* Osmond, *Chione fernandoensis* English, *Ostrea veatchii* Gabb, *Pecten healeyi* Arnold, *Pecten oweni* Arnold, *Turritella cooperi* Carpenter and *Fusinus barborensis* Trask.

Solenosteira angelensis n. sp.

Plate I Figs. 3 and 5

Shell thick, ventricose, spire low with three rapidly enlarging whorls and part of a fourth, apex broken; body whorl rounded and angulate above; suture distinct; sculpture consisting of 22 rounded, major, spiral, ribs with narrow interspaces usually carrying a thread-like intercalary; axial sculpture consists of nodes on the angle of the upper whorls, there being thirteen on the penultimate whorl, and none on the last whorl where they are obsolete; incremental lines are visible on the last whorl; aperture narrow and elongate; outer lip thin, inside concealed, columella straight, smooth, callus thin, canal open, rather wide and slightly curved, external siphonal fasciole very feeble, umbilical pit very shallow or almost lacking. Height of type 36 mm., diameter of type 23 mm., apical angle 72°.

Locality:—Mouth of Brea Canyon, Puente Hills, Los Angeles Co., Calif. Fernando Formation, lower Pliocene. Collected by C. M. Carson. One specimen.

Associates:—*Alectrion perpinguis* Hinds, *Arca multicosata* Sowerby, *Argobuccinum pacificum* Dall, *Bursa californica* Hinds, giant *Conus*, *Pecten ashleyi* Arnold, *Pecten oweni* Arnold, *Pecten hastatus* Sowerby, and *Thracia trapezoides* Conrad are commonly found in the Fernando Formation of the Puente Hills.

Cantharus fortis. Carpenter

Pisania fortis Carpenter., Ann. and Mag. Nat. Hist., 3rd Ser. Vol. 17, April 1866, pp. 277, Cooper, 7th Ann. Rept. Cal. St. Min. 1888, p. 260. Arnold Mem. Cal. Acad. Sci. Vol. 3, pp. 227.

"P. testa P. insigni simili, sed solidiore; crassissima, sculptura valde impressa; anfr. norm. v., parum rotundatis, suturis distinctis, costis radiantibus t. juniore circ. XII., obtusis, parum expressis, postea obsoletis; liris spiralibus validis, cebris (quarum t. juniore V., postea X., in spira monstrantur), subaequalibus, anticis majoribus; canali recurvata; lacuna umbilicali magna; labro intus crebrilirata; labio conspicuo, spiraliter rugose lirato.

Hab.—Santa Barbara, Pleistocene Formation. (Jewett.)"

Cantharus fortis closely resembles the living *C. elegans* Gray, but differs from it in having finer and closer internal ribbing on the outer lip, in having a greater tendency to develop intercalaries on the surface, in being less nodose on the body whorl, and in having more, and more prominent plaits on the columella.

Localities:—Santa Monica Canyon, Los Angeles Co., Calif., San Diego Formation, lower upper Pliocene. Collected by D. Arnold. Four miles west of Santa Barbara, Santa Barbara Co., Calif., Santa Barbara Formation, upper Pliocene; Timber Canyon, Santa Paula, Ventura Co., Calif., Ventura Formation, upper Pliocene, collected by C. A. Waring. San Pedro, Los Angeles Co., Calif., upper San Pedro Formation, upper Pleistocene.

Close study of this species and of the genera *Pisania* and *Cantharus* has convinced the writer that *Pisania fortis* should be assigned to the genus *Cantharus*.

Scarlesia portolaensis Arnold.

Fusus portolaensis Arnold.

Proc. U. S. Nat. Mus. Vol. 34, pp. 345-390. Pl. 37, Fig. 8.

"Description—Shell attaining a length of at least 60 mm., fusiform, moderately slender; apex acute, whorls 7 or more, very convex, slightly compressed above near suture; nuclear whorls unknown; the next four crossed by nine very broad, prominent, rounded varices extending from lower suture to upper revolving sutural ridges; interspace between varices deep and V-shaped; about 8 sharply defined, rounded, revolving ribs (between each pair of which on the lower whorls is often a small intercalary) occur on each whorl in addition to the sutural rib which is more prominent than in the others; whole surface crossed by numerous small incremental lines; body whorl quite regularly convex, projected into a long, slightly outward-curving pillar, varices obsolete, or nearly so, on the body whorl, and also on the penultimate whorl on the larger specimens, as in *F. barborensis* Trask; suture distinct, wavy. Aperture elongate-elliptical; outer lip internally striate, inner lip smooth, gently concave; canal rather long, narrow, curved outward toward anterior extremity.

Dimensions—Length, 62 mm., latitude, 31 mm., longitude of body whorl, 44 mm., longitude aperture and canal, 34 mm., apical angle about 49°."

Horizon—Purissima formation and Fernando formation, lower Pliocene.

"Localities—Santa Cruz quadrangle, San Mateo County, locality No. 6, on Sausal Creek, one-half mile southwest of Portola, also occurs at about the same horizon at several localities in eastern Monterey County and western Fresno County, type locality, U. S. G. S. No. 4665, Etchegoin (upper Miocene or lower Pliocene) formation, White Creek, 19 miles northwest of Coalinga, Fresno County."

Also from Fugler's Point, Asphalt Mine, Santa Maria, Santa Barbara Co., Calif. Fernando Formation, lower Pliocene. Collected by J. O. Lewis.

Careful comparison with the living *Searlesia dira* Reeve shows this species to be of the same genus but different specifically. *S. portolaensis* differs from *S. dira* in attaining somewhat greater size, in being more nodose, in being slightly more ventricose, and in having a much larger apical angle (47° as against 38°). *S. portolaensis* resembles *Kellettia kelletii* Forbes, but is more slender, has a shorter canal, is smaller, and is much less nodose on the last whorl. Specimens of *S. portolaensis* Arnold from the Fugler's Point locality differ from those from the Purisima Formation in being somewhat nodose on the penultimate and body whorls, but the difference was not considered specific.

Cantharus arnoldi Rivers.

Plate I Fig. 1

- Chrysdomus arnoldi* Rivers.
Bull. So. Calif. Acad. Sci. Vol. 3, No. 5, 1904, Pg. 70.
Chrysdomus arnoldi Rivers, Arnold.
Proc. U. S. Nat. Mus. Vol. 32, Pl. 50, Fig. 10.
Chrysdomus arnoldi Rivers, Arnold. U. S.
G. S. Bull. 309, Pl. 40, Fig. 10.

"Shell thick, robust, chalk white; elegantly fusiform; spire about one-fifth of the whole; spire compressed; whorls about five; nucleus and following whorl missing; the third and fourth whorls are sculptured with rather wide transverse ridges; but on the fifth whorl the ridges are nearly obsolete; sutures roughly encrusted; body whorl strongly shouldered, but not tabled; the sculpture consists of fine revolving flattened striae or ridges crossed at intervals by strong incremental lines which perhaps in an unworn example might show varices; in the fossil there appears faintly a cancellate pattern; all the whorls bear an alternate series of fine revolving ridges which on the body whorl gages two to a mm.; columella medium, twisted; channel open but shallow; incrustated thickly interiorly; aperture pyriform; umbilicus subperforate as in *Pisania fortis* Carp.

Dimensions: Long. 40 mm., Lat. 29 mm.
Geological formation, Pliocene. One specimen.
Locality: Crawfish George's; San Pedro, Calif."

This species was described but not figured by Prof. J. J. Rivers. It was recognized and figured unaccompanied by the original description by R. Arnold and is now being refigured with the original description. Comparison of this species with the genus *Cantharus* shows it to be a *Cantharus*. It has the fold on the columella usually found in *Cantharus*.

Localities:—Elsmere Canyon, Los Angeles Co., Calif. Fernando Formation, lower Pliocene. Holser Canyon near Piru Valley, Ventura Co., Calif., Fernando Formation, lower Pliocene. Collected by C. M. Carson.

Cantharus angulatus Arnold.

Pisania fortis var. *angulata* Arnold. Proc. U. S. Nat. Mus.
Vol. 32, 1907, pp. 536, Pl. L, figs. 6 and 7.

"Description—Shell fusiform, short; spire elevated; apex subacute to subangular, whorls angular, about three-fourths of the whorl being below the angle; body whorl below the angle quite uniformly convex. The surface sculpture varies considerably in individual specimens; in the type the sculpture of the body whorl consists of ten equal subequidistant rounded subrugose spiral ridges, each interspace being

ornamented by one less prominent but slightly more rugose revolving line on each side of which still finer lines may often be distinguished; above the angle are five revolving lines, less prominent than those on the lower part of the whorl, but alternating in relative size in the same manner as the latter. The penultimate and earlier whorls have about eleven longitudinal waves or low ribs which become most prominent on the angle of the whorls, forming more or less prominent nodes. A prominent sutural riblet is developed on the posterior portion of the whorl. Suture wavy, appressed, distinct. Aperture pyriform; outer lip unknown but probably denticulate. Unbilicus subperforate.

Dimensions:—Longitude (restored), about 55 mm., latitude, 29 mm., body whorl, 43 mm., aperture, 30 mm., deflection, about 62°.

Notes:—This variety differs from the typical *Pisania fortis* Carpenter, in being broader and in having prominently angulated whorls. The revolving lines in the former are also usually weaker than in the typical form."

"Locality—Elsmere Canyon near Union Oil Company's wells, 2½ miles southeast of Newhall, Los Angeles County, Calif." Collected by Ralph Arnold.

"Horizon—Middle Fernando Formation (lower Pliocene). Known only from the type locality where several specimens were found."

Examination of specimens of this form shows the inside of the outer lip to be crenated as Arnold suggested, and also revealed several low folds on the anterior portion of the columella and also a stronger fold on the columella near its junction with the outer lip, as in *Cantharus*. This form differs from *Cantharus fortis* Carpenter, in being more ventricose, less nodose, in having the major spiral ribs closer together, and in having the intercalaries much finer. For these reasons it has been raised to specific rank and assigned to the genus *Cantharus*. Arnold's varietal name being retained.

Locality—Calabasas Region, Los Angeles Co., Calif., Fernando Formation, lower Pliocene.

EXPLANATION OF PLATE

(All figures approximately natural size).

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Photographs by Crandall of Palo Alto